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(54) **Solar cell and method of manufacturing the same**

(57) A solar cell is discussed. The solar cell according to an embodiment includes a semiconductor substrate, a first conductivity type region and a second conductivity type region disposed on the same side of the semiconductor substrate, wherein at least one of the first and

second conductivity type regions includes a main region and a boundary region disposed at a peripheral portion of the main region, and the boundary region has at least one of a varying doping concentration and a varying doping depth.

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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2009/227097 A1 (BATEMAN NICHOLAS [US] ET AL) 10 September 2009 (2009-09-10) * paragraphs [0023] - [0043]; figure 6 *	1-13	INV. H01L31/0224 H01L21/266 H01L31/0747 H01L31/18 H01L31/0352
X	FR 2 988 908 A1 (COMMISSARIAT ENERGIE ATOMIQUE [FR]) 4 October 2013 (2013-10-04) * page 15, line 24 - page 17, line 24; figures 7A-7C *	1-11	
X	US 2010/258182 A1 (AKIMOTO HIDEKI [JP]) 14 October 2010 (2010-10-14) * paragraphs [0046] - [0064]; figures 2-5 *	1,2,6,7, 9-11	
X	US 2012/255603 A1 (YU YOUNG-JUNE [US] ET AL) 11 October 2012 (2012-10-11) * the whole document *	1,2,6,7, 9-13	
X	US 2011/315937 A1 (AOYAGI TAKUYA [JP] ET AL) 29 December 2011 (2011-12-29) * paragraph [0152]; figure 7 *	1,10	
X	EP 1 835 548 A1 (NAOETSU ELECTRONICS CO LTD [JP]; SHINETSU CHEMICAL CO [JP]) 19 September 2007 (2007-09-19) * abstract *	1,10	TECHNICAL FIELDS SEARCHED (IPC) H01L
X,P	US 2014/174516 A1 (CHOI YOUNG MOON [KR] ET AL) 26 June 2014 (2014-06-26) * the whole document *	1-13	
The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of the search 19 June 2015	Examiner Rodríguez-Gironés, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 00 4013

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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19-06-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009227097 A1	10-09-2009	TW 200950122 A US 2009227097 A1 US 2014154834 A1 WO 2009111668 A2	01-12-2009 10-09-2009 05-06-2014 11-09-2009
FR 2988908 A1	04-10-2013	EP 2834857 A1 FR 2988908 A1 US 2015075595 A1 WO 2013150074 A1	11-02-2015 04-10-2013 19-03-2015 10-10-2013
US 2010258182 A1	14-10-2010	CN 102369580 A EP 2417607 A1 JP 2012523696 A KR 20110135880 A TW 201101337 A US 2010258182 A1 WO 2010118004 A1	07-03-2012 15-02-2012 04-10-2012 19-12-2011 01-01-2011 14-10-2010 14-10-2010
US 2012255603 A1	11-10-2012	NONE	
US 2011315937 A1	29-12-2011	CN 102318013 A DE 112009004970 T5 JP 5215458 B2 KR 20110105872 A US 2011315937 A1 WO 2010109541 A1	11-01-2012 21-06-2012 19-06-2013 27-09-2011 29-12-2011 30-09-2010
EP 1835548 A1	19-09-2007	EP 1835548 A1 JP 3962086 B2 TW I323040 B US 2007264746 A1 WO 2006075426 A1	19-09-2007 22-08-2007 01-04-2010 15-11-2007 20-07-2006
US 2014174516 A1	26-06-2014	KR 20140082050 A US 2014174516 A1	02-07-2014 26-06-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82